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them to have been, from intimate personal acquaintance, both with the men and with the country to which they were applied on precisely the same evidence as is to be found in Canada, are at least entitled to be regarded as something more than 'fancy sketches.'

"I am, my dear Professor Dana,
"Very truly yours,
"(signed) ALFRED R. C. SELWYN."

Inquiry Regarding Fresh-water Pearl Fisheries.

I ENCLOSE herewith a circular of queries that I am very desirous of having answered to assist in carrying out an investigation in regard to the locations, yield and proper protection of fresh-water pearl fisheries in the United States. All correspondence on this subject should be addressed to me as follows: G. F. K., care of United States Commission of Fish and Fisheries, Washington, D. C.

GEORGE F. KUNZ.

LIST OF QUESTIONS.

The pearl-bearing mussels: 1. Nature of stream in which found, kind of bottom, character of water; 2. Geological character of the district as to rock, soil, etc.; 3. General abundance of mussels; 4. Size, shape, and position of the mussel beds; 5. Local names of mussels; 6. Habits of mussels; 7. Enemies and fatalities to which mussels are exposed, nature and extent of destruction by muskrats, hogs, freshets, etc.; 8. Size, shape, and color of mussels; 9. Species of mussels in which pearls are most common; 10. Proportion of mussels in which pearls occur; 11. Sizes, or other peculiarities, of shells in which pearls are found. The pearls: 12. Nature and origin of pearls; 13. Position in mussel; 14. Size, shape, and color of pearls; 15. Relative value of pearls of different sizes, shapes, and colors; 16. Markets for pearls; 17. Prices for pearls. The fishery: 18. Method of taking the mussels; 19. Description of apparatus used in taking mussels and in opening the shells; 20. Methods of extracting the pearls; 21. Treatment of pearls when found; 22. Utilization of mussels after extraction of pearls or after opening; 23. Principal occupations of mussel fishermen; 24. Statistics of fishery in 1893: Fishermen, number; Boats, number, value; Apparatus, number, value; Pearls, number, value; 25. Statistics, complete or partial, for previous years; 26. Period when pearl fishing was of greatest importance in district; 27. History of origin and growth of fishery; 28. Exhaustion of mussel beds, causes, rapidity; 29. Do exhausted beds become replenished, and in what time? 30. Is State protection of beds desirable or necessary?

Pseudo-aurora.

THIS phenomenon has again, this winter, been of unusual beauty and brilliancy over lights in this city. The following is an explanation of the occurrence: The phenomenon is not a shadow effect, as explained by Mr. Hazen in a number of last year's *Science*; neither has it any electrical significance, as has been indicated by several writers. It has a true light effect and consists of an apparent bright shaft of light extending upwards to the zenith over bright lights. If the lights are swung high it may also be seen extending from the light to the earth. It only occurs under certain atmospheric conditions, which are about as follows: Cold, cloudless nights, with but slight wind, if any, following upon an atmospheric humidity approaching saturation. Under these conditions, small, almost solid, flat, hexagonal ice crystals fall in a constant mist, glistening in a strong light, like particles of diamond dust. It is in the peculiar flat, light form of

these crystals, associated with the manner in which they fall, that explanation of the phenomenon rests.

Leaves falling from trees, during a calm, preserve, during the chief part of the descent, the horizontal position. This is found by careful observation to be alike true of the fall of the flat, hexagonal ice particles at the times when pseudo-aurora occur. The rays of light from the lamp or other brilliant light, striking the under flat surfaces of the crystals, are simply reflected to the eye of the observer; and the eye receives rays reflected from all particles of ice within the vertical plane through the eye and through the lamp or source of light, referring the grand final light effect to the vertical.

That it is not of an electrical nature is evident in that some of the most brilliant shafts occur over bonfires, and when the moon is low in the horizon, on nights showing the aurora, it is seen to cause the same phenomenon.

H. L. BOLLEY.

Fargo, North Dakota.

Notes and Queries.

Rubus strigosus is rather common in Waterbury, Conn., but I have never found it bearing perfect fruit (except as noted below). The canes are quite as strong and thrifty as any found in northern New England, and plenty of flowers are produced, but rarely more than two or three drupelets in a berry ever mature.

My observations extend over a period of more than thirty years. At present the plant is much more abundant than formerly, but the failure of the fruit to mature is the same as at first. Asking Dr. Asa Gray, at a meeting of the Botanical Section of the A.A.A.S., several years ago the cause of this, he remarked that "he should like to see the flowers" before answering.

Of course it is because they are not *fertilized*, but why are they not? Honey bees here, as further north, find the raspberry blossoms a rich source of honey, and any part they may take in the fertilizing process ought to be as effective here as in other sections. The exception to this sterility makes the sterility still more singular. Along the ditches through some of our shallow peat bogs this red raspberry grows, sometimes, very rank and tall, and it is not rare to find, in September and October, the terminal portion of the year's growth full of blossoms and perfect but unripe fruit. I have seen these berries fully grown, very large, but none quite ripe, though they probably do ripen in warm seasons. There is a cause for this failure of the summer crop, but what is it? I believe the cultivated species and varieties of the raspberry do as well here as anywhere. It is well understood that the failure of the first crop of red clover to produce many seeds is because the bumble-bees, the only insects that frequent its flowers for honey, are too few to transfer the pollen.

This cannot be the case with the raspberry. It may be found that the honey-bee, wholly intent on gathering honey, neglects the pollen altogether and that the pollen gatherers prefer that of some other flowers found here. The interrelations between plants and insects are not all yet found out, but the suggestion made above may have no foundation in fact.

Thirty years ago the farm yards and road sides in western Connecticut were white in the summer from the abundance of the flowers of the May weed (*Marutā Cotula*). A few years later—but just when no one can tell, for it passed without observation—this plant disappeared entirely. For years not a single specimen could be found. It is now slowly reappearing, but not yet abundant. Over how large a part of the country this disappearance took place I cannot say, for my observations did not extend far beyond Waterbury and the adjacent towns.

Here, as in numberless other cases, the ever-recurring *why* appears. Certainly no *apparent* cause banished this

hardy annual. This is not a solitary instance of this sort, but I do not remember to have seen any explanation of such facts.

H. F. BASSETT.

Waterbury, Conn.

Chilopoda Migrating in Broad Day-light.

SEVERAL years ago a friend of the writer saw, during late summer in Nebraska, a great number of some chilopod migrating in the day-time. They were all going in one direction across a road where they were readily seen, and continued to pass over it for more than a week. A very dry spell from which the country had been suffering may have had something to do with the movements of the animals, for they disappeared after a heavy rain. The fact that they were seen in large numbers, as well as their migrating in broad day-light, is very interesting, since none of the Chilopoda are usually seen in great numbers or where there is much light. Repeated questions, however, showed that the animals were some chilopod, probably a *Scolopendra*, since they were too large for a *Lithobius* and can scarcely have been a *Scolopocryptops*.

If any reader has ever seen any of the Chilopoda migrating at any time, or in very large numbers, he will confer a favor upon the writer at least by letting him know through the columns of *Science*, or by letter, the locality, season; state of weather, duration of migration and if possible the species observed.

F. C. KENYON.

College Hill, Mass.

A Miniature Water Lily.

IN reply to Prof. J. E. Todd's inquiry of Dec. 15, his Nymphaea found near Red Lake is very interesting, as it is undoubtedly *N. odorata* Ait., var. *Minor sims.*, and the location is between that reported by J. M. Macoun from Moose River, near James Bay, in 1885, and that reported by the Natural History and Geological Survey of Minnesota, in Turtle Lake, Otter Tail Co., Minn., in 1883.

H. B. AYRES.

Corn.—A Query.

LATE last fall a friend found a peculiar ear of corn growing in his garden. He had planted ordinary sugar corn and was much surprised to find an ear each grain of which had a distinct shuck, besides the ordinary shuck on the outside. The ear is of average size, although the cob is rather small. Similar corn had been exhibited at the county fair a few years before. Is this corn going back to some earlier form?

E. M. DANGLADE.

Vevay, Ind.

Rope of Maggots.

PROFESSOR WILLISTON, in his note, "An Explanation of the Rope of Maggots," remarks that the phenomenon has been but seldom observed in America, which leads me to give a couple of observations of my own, in Indiana. On the Campus of Purdue University is a hedge of Norway spruce, along one side of which is a drive, and on the other a walk of gravel and cinders, both raised somewhat above the level of the ground. On July 10, 1888, following a rainfall of 3 inches, vast numbers of these larvæ formed "ropes" covering a width of from one half to two inches, marching out from the hedge and following along the walk for a considerable distance, when they would return again to the hedge, crawling in and about the latter with seemingly no especial object in view, though it was here that the maximum in width of column of march was reached. There were several separate "armies," each following an independent winding course, but separated from each other by short distances. A considerable number were placed in a breeding jar on grassy sod, where they again took up

their line of march, forming a ring around the outer edge of the grassy disc. They continued to crawl around and around this edge for some time, forming a "rope" the size of one's finger.

On July 15, 1889, the day following a rainfall of 1.22 inches, I again witnessed a precisely similar phenomenon and in the exact locality on the walk where it had taken place the previous year. This appeared to me to indicate a tendency to local, permanent breeding places, the larvæ subsisting on decaying vegetation and in this case the foliage of the spruce. It would also appear that these larvæ had in each case been driven out of their quarters by the water collecting therein.

F. M. WEBSTER.

Wooster, Ohio.

BOOK REVIEWS.

Pain, Pleasure and Aesthetics. By HENRY RUTGERS MARSHALL. New York, Macmillan & Co. \$3.

THE object of this work is to present a theory of pain and pleasure, and from that as a basis to develop a philosophy of art. The author has evidently given a great deal of time and thought to his subject, and has made a careful study of the views of others, as well as of the psychological principles involved. Mr. Marshall begins his discussion by remarking on the difficulty of finding a word to designate both pleasure and pain, the word *feeling*, which some writers use, being, in his opinion, too varying and ambiguous in meaning, while *sensation* and *emotion* are not only ambiguous but much too narrow; hence he uses the compound word *pleasure-pain* as the only available term to cover the two kinds of phenomena in question while excluding everything else. He then proceeds to inquire what pleasures and pains in their nature are and how they are related to the other phases of consciousness. The common theory is that the states of consciousness that we call feelings, or pleasures and pains, are a distinct class of mental phenomena co-ordinate with thought and action yet inseparably connected with them. Mr. Marshall believes this to be an error, and maintains that they are *qualities* of the other states of consciousness, or, in his own words, "Pleasure-pain modes are *qualies* of all mental states: qualities, one of which must, and any of which may, belong to any element of consciousness" (p. 145). This theory he supports with many arguments, accompanied by criticisms of other views, and then enters on an elaborate discussion of the physical basis of pleasure and pain, to which we can only refer our readers, as it is much too difficult and detailed to be analyzed here. We find ourselves, however, unable to accept his theory of what pleasure and pain are, notwithstanding the considerations urged in its favor. That some feeling of pleasure or pain accompanies every mental state, whether thought, sensation, volition or any other, is undoubtedly true; but we cannot bring ourselves to regard the pleasure or pain as a quality of the given state. A pleasure generally accompanies a new thought; but the pleasure seems to be a distinct phase of consciousness rather than a quality of the thought itself. Nor can we regard the feeling of compunction which often attends the doing of a wrongful act as a quality of the act or of the moral judgment that reason passes upon the act. But the subject of the feelings is so difficult that the arguments of an intelligent thinker can hardly fail to be useful, whether one agrees with his views or not.

Mr. Marshall's theory of pain and pleasure, however, is only a part of the doctrine set forth in this book; he bases on it a theory of beauty and of the aims and motives of art. "The art impulse," he thinks, "is a blind impulse which leads men to create with little or no notion